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The Generalizability of Knowledge

as Measured by a Single-Response Situational Judgment Test Across Domains

by

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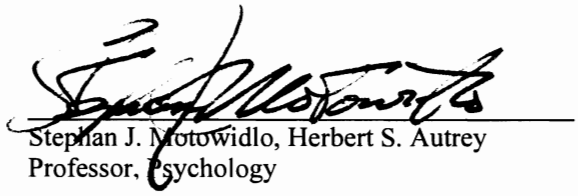

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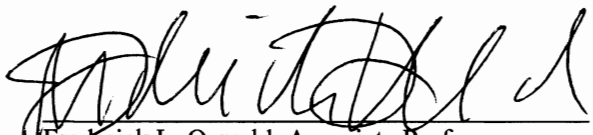

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ABSTRACT

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The current investigation examined the consistency of two different types of procedural knowledge as measured by a single-response Situational Judgment Test (SJT) across three different professions, including those of a physician, volunteer, and human factors professional (HFP). The first of these types of knowledge refers to Implicit Trait Policies (ITPs), which represent general procedural knowledge as measured by an SJT and have been shown to account for variance in job performance (Motowidlo & Beier, 2009). The second class of knowledge involves a bifurcation of the knowledge construct into knowledge about effective and ineffective interpersonal interactions at work. Undergraduates ($N = 152$) completed a personality measure and an abbreviated version of three single-response SJTs created for medical students, volunteers, and HFPs. Results suggest that there is moderate consistency in knowledge about effective and ineffective behavior across different jobs and that each type of knowledge is differentially related to personality traits.

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Introduction

One of the most important issues facing personnel selection research is the possibility that different dimensions of job performance have different individual difference determinants (Schmitt, Cortina, Ingerick, & Wiechmann, 2003). Models of job performance postulated over the past two decades (Campbell, 1999; Campbell, McCloy, Oppler, & Sager, 1993; Motowidlo, 2003; Motowidlo, Borman, & Schmit, 1997) have emphasized that determinants such as knowledge, skill, and motivation mediate the relationship between individual difference variables and dimensions of job performance. An outline of this literature is presented, followed by a discussion of theory and research on the construct measured by a particular personnel selection tool, the situational judgments test (SJT). What do SJTs measure? Is what they measure unique to the job assessed by the particular SJT or does it generalize across jobs? If the construct measured by SJTs is not saturated with job-specific information, how exactly is it characterized? The present investigation seeks to explore these questions by administering three SJTs, each created for a different job, along with a personality measure to a sample of undergraduate students.

Job Performance Models

Job performance, which may be considered *the* criterion in the field of I/O psychology, has been defined as "behavior or action that is relevant for the organization's goals and can be scaled (measured) in terms of the level of proficiency (or contribution to goals) that is represented by a particular action or set of actions" (Campbell, 1999). Identifying the variables that predict job performance is often the principle goal of psychologists in our field.

John Campbell parsed the job performance construct into eight distinct components, which make up what is known as the *Campbell Model*. These include job-specific task proficiency, non-job-specific task proficiency, written and oral communication proficiency, demonstration of effort, maintenance of personal discipline, facilitation of peer and team performance, supervision/leadership, and management/administration (Campbell, 1999). Each of these dimensions of job performance has its own set of *determinants*. These determinants are latent variables that take the form of declarative knowledge, procedural knowledge and skill, and motivation. The antecedents of these determinants of performance are variables that are more distally related to the performance construct and affect it through their relation to these three determinants. These variables can include personality traits, interests, values, or personal experiences (Campbell et al., 1993).

Another model of job performance that complements Campbell's model distinguishes *task performance* from *contextual performance* (Borman & Motowidlo, 1993). Task performance involves supporting an organization's technical core by either creating goods and services or by maintaining an organization's technical requirements. Contextual performance enhances the context in which the technical core operates. It includes behaviors such as helping coworkers, obeying rules and policies, defending the organization, and volunteering to take part in extra-role activities (Motowidlo et al., 1997). Although this model of job performance differs from Campbell's model in the number of performance dimensions it identifies, the two models can be thought of as complementary. Each offers a different level of specificity, with task and contextual

performance forming higher-order factors of the performance structure and Campbell's eight dimensions forming sub-factors of these two (Campbell, 1999).

Contextual Knowledge and its Antecedents

Because task performance by definition involves supporting an organization's technical core, it must involve behaviors that are specific and unique to the technical requirements of a particular job. In order to perform these behaviors effectively an individual must have the technical knowledge about how to do so. For this reason, the accumulation of technical knowledge is likely to be predicted by cognitive ability (Motowidlo et al., 1997). Conversely, contextual performance involves behaviors that are not necessarily specific to a particular job but are generally valuable to any organization in which they are performed. For example, volunteering to carry out activities that are not formally part of the job, such as cleaning out the communal refrigerator, may be valuable for teachers, physicians, attorneys, and mechanics alike. Other contextual performance activities, such as persisting with enthusiasm, helping and cooperating with others, following rules even when inconvenient, and defending the organization are also likely to generalize across jobs in terms of their value to an organization. Motowidlo and colleagues (1997) postulated that contextual performance is likely to be more strongly predicted by non-cognitive factors such as personality traits. Individuals who possess personality traits that predispose them to acquiring contextual knowledge about how and when to engage in contextual activities are more likely to have higher levels of contextual performance. In theory, individuals' personality traits and ability levels partially determine what they learn as they interact with their environments. In summary, technical

knowledge is by definition specific to a particular domain while contextual knowledge is likely to generalize across domains.

Some evidence to support the theory put forth by Motowidlo, Borman, and Schmit (1997) comes from a study on the relations between extraversion, customer service knowledge, and customer service performance for a group of sales associates conducted by Schmit, Motowidlo, DeGroot, Cross, and Kiker (1996). Their results show that customer service knowledge explained 6.6% of incremental variance in customer service performance accounted for beyond that explained by extraversion, but extraversion only explained 1.8% of the variance in customer service performance beyond that explained by customer service knowledge. Motowidlo, Martin, and Crook (2011) have found further evidence to support this theory in a study examining the relations between personality traits, knowledge about effective service encounters for HFPs, and a simulation of job performance for HFPs conducted using undergraduate students. Their results demonstrated that conscientiousness is associated with knowledge about effective and ineffective approaches to service encounters and that this knowledge is associated with performance in work simulations. In addition, their results indicated that knowledge scores accounted for incremental variance in performance beyond that predicted by personality but that personality did not account for incremental variance in performance beyond what was predicted by knowledge scores. Thus, personality traits are positively related to contextual knowledge about how to behave in service encounters and in turn, this knowledge is positively related to performance.

To explain why personality traits are associated with contextual knowledge, Motowidlo (2003) developed the notion of *dispositional fit*. The theory of dispositional

fit suggests that people hold beliefs about the best way to handle interpersonal situations at work that are consistent with their basic personality traits. To the extent that work situations differ in the degree to which they demand the expression of a particular personality trait and a person's belief about trait expression coincides with what the situation demands, that person will have knowledge about how to behave effectively in that particular situation.

Situational Judgment Tests

Situational judgment tests (SJTs) are personnel selection tools that typically present applicants with written representations of hypothetical situations and ask individuals to choose a suitable response from a set of plausible response alternatives (Motowidlo, Dunnette, and Carter, 1990). SJTs are traditionally scored by comparing applicants' responses to subject matter experts' (SMEs) responses so that the more similar an applicant's responses are to those of the expert, the higher the overall score (Motowidlo, Hooper, & Jackson, 2006b). SJTs have been shown to predict job performance and afford incremental validity in prediction beyond that provided by personality measures and cognitive ability tests (McDaniel, Hartman, Whetzel, & Grubb, 2007). However, many researchers (Motowidlo et al., 2006a; b; Motowidlo & Beier, 2010; Motowidlo, Kell, Martin, Stotts & Moreno, 2011) have recently begun asking, why?

There has been some debate in the literature around whether SJTs should be classified as methods or constructs (Schmitt & Chan, 2006; Arthur & Villado, 2008). On the one hand, the SJT can be considered a method that can be used to assess different constructs, but on the other hand, the content of typical SJTs limit the range of constructs that it can measure (Schmitt & Chan, 2006).

Research uncovering the constructs actually being measured by SJTs remains inconclusive (Ployhart & Ehrhart, 2003). Some researchers have argued that SJTs measure the tacit knowledge component of what is called *practical intelligence* (Stemler & Sternberg, 2006). The cognitive aspect of practical intelligence has two components. It involves both explicit knowledge like that acquired through formal training and tacit knowledge that entails an instinctive acknowledgement of what the best course of action is in a given situation. This tacit knowledge is similar to contextual knowledge in that both are procedural in nature and both involve implicit learning (Schmitt & Chan, 2006).

Motowidlo, Hooper, and Jackson (2006a) have also suggested that SJTs measure procedural knowledge. This knowledge is described as being procedural in nature because it is about effective and ineffective approaches to dealing with problematic situations encountered at work. In response to research that has shown that SJTs are positively correlated with personality measures (McDaniel & Nguyen, 2001), these researchers extended the notion of dispositional fit to argue that *implicit trait policies (ITPs)* mediate the relationship between personality traits and the procedural knowledge measured by an SJT. ITPs are beliefs about the effectiveness of varying levels of trait expression in work situations. In theory, both an individual's basic personality traits and personal experiences shape their ITP for a given trait.

Implicit Trait Policies (ITPs)

In ITP theory, individual differences in basic personality traits influence how an individual judges the effectiveness of a certain trait expression, such that a person generally values the expression of a basic trait they are high on more than one they are low on. For example, someone who is very conscientious may rate an action that

expresses a high degree of conscientiousness as being very effective. When this conscientious action is indeed effective in a particular job, this rating represents procedural knowledge about how to behave correctly in that job (Motowidlo & Beier, 2010). In this way, knowledge and beliefs like ITPs are distinct from one another such that beliefs only represent knowledge when they are correct.

An individual's ITP for a given trait can be calculated by scoring an SJT for a particular job in a way that is different from the traditional scoring method. An ITP is essentially a correlation between the extent to which a behavior conveys a particular trait and an individual's effectiveness rating assigned to that behavior. Alternatively, it can also be computed as the raw beta weight that results from regressing a participant's effectiveness rating assigned to a behavior on the level of trait expression it conveys (Motowidlo & Peterson, 2008). In a multiple-response format SJT, each response alternative represents a behavior, so that each option expresses a certain level of a trait (Motowidlo et al., 2006b). Thus, once an individual made judgments about the effectiveness of all of the behaviors in a given SJT, all that needs to be done to calculate the test-taker's ITP for a trait is to designate the level of trait expression to each behavior and then compute either a correlation or a raw beta weight using these two ratings. Behaviors can be rated for the extent to which they convey more than one trait so that, for example, a behavior may express a high degree of conscientiousness but a relatively low degree of agreeableness.

ITPs are influenced not only by traits themselves, but also by learning effects (Motowidlo et al., 2006b). As people go through life, they undoubtedly have different experiences that educate them about the effectiveness of expressing certain traits, whether

these are in the form of work experiences or social interactions. For example, an individual could learn through his or her experiences that it is most effective to behave in a conscientious manner while on the job, and as a result, could develop an ITP that is representative of knowledge about effectiveness at work. Thus, ITPs are influenced causally by both an individual's traits and personal experiences.

Specialized and General Job Knowledge in Relation to Implicit Trait Policies

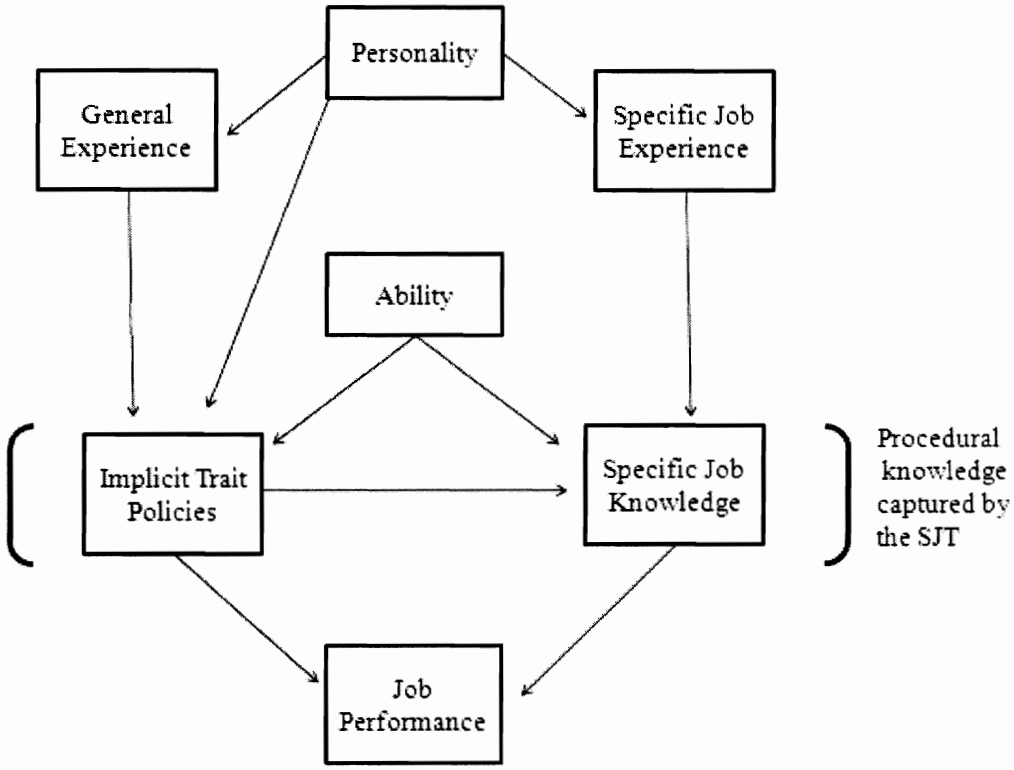
The procedural knowledge measured by SJTs can be broken down into general knowledge about the effectiveness of expressing certain traits and specialized knowledge about which traits should be expressed in certain job contexts (See Figure 1). It is theorized that general knowledge about the effectiveness of trait expression (i.e. ITPs) is accumulated broadly through life experiences and that specialized, job-specific knowledge is typically learned through tenure or training on a job (Motowidlo & Beier, 2010).

Results from a study done by Motowidlo and Beier (2010) suggest that specific, specialized job knowledge contributes to job performance independently from the general knowledge about trait expression contained in ITPs. These authors showed that an SJT scoring key based on judgments of effectiveness made by novices can still produce valid SJT scores that are significantly correlated with job performance measures ($r = .29$, $p < .05$). However, once the novices' judgments were excised of their relations to trait expressions, the scores produced by this residual scoring key ceased to correlate with the measure of job performance. Given that these novices were undergraduate students who lacked the on-the-job experience necessary for the development of specialized job knowledge, this observation offered evidence to suggest that the general knowledge of

trait effectiveness contained in ITPs was driving this correlation. In view of the fact that general knowledge about effective trait expression can predict job performance and can be developed by individuals without any kind of specialized training, these implicit policies have the potential to be interesting and useful constructs for personnel selection in organizations.

These authors also suspected that ITPs might generalize across at least some professions. For example, an individual may think that acting conscientiously is effective in several work-related contexts. To the extent that conscientious action *is indeed* effective across several job contexts, this individual would have at least some knowledge about effectiveness in those jobs. However, in light of the fact that there is no empirical evidence as of yet to support the generalizability of knowledge tested by SJTs across domains, the possibility that people have different ITPs for the same trait for different professions cannot be dismissed.

Figure 1. A theory of the procedural knowledge measured by SJTs (modeled after Motowidlo & Beier, 2010)



Whether general knowledge about effective trait expression (i.e. ITPs) varies across different professions is an empirical question. The generalizability, or alternatively, the specificity of this knowledge to different job contexts has never been concretely examined. One of the purposes of this study is to explore the consistency of ITPs across jobs and to examine how personality traits are related to knowledge scores and to ITPs.

Procedural Knowledge about Effective and Ineffective Behaviors at Work

Recently, a new type of SJT has been developed, called the single-response SJT. This test is comprised of critical incidents, which are short behavioral episodes that describe work behaviors that are particularly effective or ineffective (Motowidlo, Crook, Kell, & Naemi, 2009). Applicants are instructed to rate each item for its level of behavioral effectiveness using a Likert-type scale and are typically evaluated by having their responses compared to those made by SMEs. This method for creating SJTs has been shown to be valid in predicting work effort, a dimension of job performance ($r = .28$, $p < .01$; Motowidlo et al., 2009) and is less complicated and time-consuming than the method used to develop the traditional, multiple-response format. As items are taken directly from critical incidents provided by experts, the need for the construction of response alternatives is bypassed (Motowidlo et al., 2009).

A recent study by Motowidlo, Martin, and Crook (2011) demonstrated that procedural knowledge as measured by a single-response SJT designed to assess knowledge about effective work behaviors for human factors professionals (HFPs) can actually be broken down into two types: knowledge about effective behaviors at work and knowledge about ineffective behaviors at work. In this study, procedural knowledge was measured by comparing participants' ratings of effectiveness to those made by SMEs. Thus, the experts' ratings determined whether an item was considered to be effective or ineffective. Scores were calculated so that each participant had a score for the effective items and a score for the ineffective items.

Previous research has demonstrated that knowledge measures developed using the critical incident technique can be scored in different ways (Martin & Motowidlo, 2010).

One method of scoring assumes the more similar an individual's judgments of effectiveness are to those of experts, the more knowledge that individual has (Motowidlo et al., 2009). The similarity between a test-taker and experts' judgments of effectiveness can be approximated by correlating the test-taker's ratings with experts' mean ratings. An alternative method of scoring presumes individuals who are better at distinguishing particularly effective behaviors from particularly ineffective behaviors have more knowledge. This method entails computing a difference score by computing the difference between a subject's summed ratings for the effective and ineffective items in a knowledge measure. This scoring strategy works under the assumption that the higher a subject's ratings are for items judged to be effective by experts and the lower their ratings for items judged ineffective by experts, the greater the difference between these two scores and thus, the higher their overall score (Martin & Motowidlo, 2010). Motowidlo, Hooper, and Jackson (2006a) showed that both difference scores and scores computed as correlations contain similar information and are very highly correlated with one another.

Previous research has shown that correlations between scales for effective and ineffective items in two SJTs ranged from low to moderate (Motowidlo, Martin, & Crook, 2011; Kell, Martin & Motowidlo, 2011). These authors argued that if knowledge about effective and ineffective behavior at work were distinct parts of the same construct, then these two types of knowledge should be relatively highly correlated with one another, within the limits of their reliabilities.

The fact that these two types of knowledge were not strongly correlated with each other within the same profession suggests that they are actually two different and unique knowledge constructs. In other words, individuals who have knowledge of behaviors that

are *effective* in a given job may not necessarily also be able to identify behaviors that are *ineffective* in that job. If the two types of knowledge are uncorrelated, then knowledge of effectiveness does not denote knowledge of ineffectiveness in a given profession, or vice versa. However, this rationale does not rule out the possibility that knowledge about effectiveness in one job may be related to knowledge about effectiveness in another job. Perhaps, knowledge about effective action, for example, draws on general experiences that inform an individual about effective behavior in a variety of jobs.

Some evidence to corroborate the suggestion that knowledge about effective behavior may be independent of knowledge about ineffective behavior comes from the training literature. Results from one study suggest that presenting only effective behaviors during training leads to difficulty identifying ineffective behaviors and responding appropriately (Joung, Hesketh, & Neal, 2006). Another study (Baldwin, 1992) trained a group of undergraduate students on assertive communication. One group of participants was presented with both positive and negative model displays while another group was only presented with positive model displays. Participants who were exposed to both positive and negative displays scored significantly higher on a measure of behavior generalization taken four weeks after the initial training. Thus, the fact that presentation of both effective and ineffective approaches to assertive communication, as opposed to the presentation of only effective approaches, leads to greater generalization of training suggests that knowledge about effective behavior does not necessarily impart knowledge about ineffective behavior. A second purpose of this study is to explore the possibility that knowledge about effective behavior and knowledge about ineffective behavior generalize across different domains.

The Current Research

The purpose of this study is to examine the consistency of two different conceptualizations of procedural knowledge as measured by SJTs assessing contextual knowledge about three different professions, including those of a physician, volunteer, and human factors professional. The first of these characterizations of knowledge distinguishes between knowledge about effective and ineffective action at work, and the second pertains to general knowledge about trait expression (i.e. ITPs) in work-related contexts.

The current investigation used items from single-response SJTs that have been used in previous studies (Motowidlo, Martin, & Crook, 2011; Motowidlo, Kell, Martin, Stotts, & Moreno, 2011). A subset of items was taken from each of these three SJTs, with each subset representing a unique job domain. The professions examined are those of physicians, human factors professionals (HFPs), and volunteers. Each of these jobs undoubtedly requires different suites of technical or task-based knowledge for proficient job performance. However, the commonality between each of these service industry professions is that they place value on helping behaviors and service. HFPs, physicians, and volunteers all need to interact with individuals as part of their jobs. Thus, the personality traits that are of interest for the current investigation are conscientiousness and agreeableness. These traits have yielded significant correlations with organizational citizenship (Borman, Penner, Allen & Motowidlo, 2001), which has been defined to include activities such as helping others, supporting the organization and volunteering to do additional work or take on extra responsibilities (Borman & Motowidlo, 1993).

In light of the recent suggestion that knowledge of effectiveness is distinct from

knowledge of ineffectiveness (Motowidlo, Martin, & Crook, 2011), it becomes interesting to address the possibility that an individual could have knowledge about effective behavior in one job and also have knowledge about effective behavior in another job, to the extent that effective behaviors are similar across jobs. This is consistent with the assumption that while technical knowledge may be unique to a particular job, contextual knowledge may generalize across jobs. For example, helping a coworker may be a behavior that is considered effective in across all three jobs. If this is true, the recognition of this effectiveness would reflect procedural knowledge about effective behavior in all of the professions examined. Using the same line of reasoning, knowledge about ineffective behavior at work could remain similarly consistent across SJTs addressing different professions. If this is the case, correlations between the professions within each type of knowledge scores will be comparable to their corresponding reliability estimates.

However, some undergraduates may have had more exposure to some jobs than other jobs. Perhaps some students have a parent that works in one of the fields under observation or have had a related summer job. If this is the case, knowledge about different professions might not be perfectly consistent across SJTs because some students would have more knowledge about some professions than others. Consequently, the first objective of this research is to test whether knowledge about effective behavior and knowledge about ineffective behavior are consistent across jobs.

The general knowledge contained in ITPs about how to behave effectively in interpersonal situations on the job is more likely to remain consistent across different domains than knowledge scores. The majority of the knowledge undergraduates students

have is likely to be in the form of general knowledge about trait effectiveness rather than job-specific knowledge, because undergraduates generally do not have any job-specific training or experience. When an individual has no experience with a particular job, their knowledge about effective behavior in that job is reduced to the knowledge of trait expression represented by their implicit trait policies (Motowidlo & Beier, 2010). Students' ITPs should remain more consistent across professions than their knowledge scores because undergraduates' ITPs represent general knowledge about trait expression rather than job-specific knowledge. Thus, a second objective of the current investigation is to compare the consistency of ITPs to the consistency of overall procedural knowledge scores.

The third purpose of the proposed research is to explore how agreeableness and conscientiousness are related to both ITPs and knowledge scores. Previous research has shown that conscientiousness is positively related to SJT knowledge scores for volunteers (r =.38, p <.01) and for HFPs (r = .21, p < .05; Motowidlo, Martin, & Crook, 2011). Agreeableness has also been shown to correlate positively with SJT scores for volunteers (r = .30, p <.01; Motowidlo et al., 2009) and with scores on an SJT assessing knowledge about effective behavior for physicians (r = .43, p < .01; Motowidlo, Kell, Martin, Stotts, & Moreno, 2011). Consequently, it is hypothesized that these two traits will be positively related to procedural knowledge as measured by the abbreviated versions of these three SJTs.

Method

Overview

This study uses materials and data from three other studies that each developed a different single-response SJT. The first of these studies developed a single-response SJT for volunteers at different organizations (Motowidlo et al., 2009). The second study developed a single-response SJT designed especially for medical students (Motowidlo, Kell, Martin, Stotts, & Moreno, 2011). The final study produced a single-response SJT developed to explore the effectiveness of HFPs (Motowidlo, Martin, & Crook, 2011). Subject matter experts' effectiveness ratings were used to develop scoring keys for each of these SJTs. In the case of the first two studies, supervisory ratings were used as criterion measures for the concurrent validity estimations. In the case of the third study, performance ratings of role-play situations were used as the criterion measure and were correlated with participants' scores on the single-response SJT. More detailed information about the development of these SJTs can be found in their respective manuscripts. Thus, descriptions about these three measures will be relatively brief. The current study uses novel data gathered from a new sample of undergraduates.

Participants

Undergraduates at a small, private Southwestern university participated in the experiment for course credit ($N = 152$).

Measures

International Personality Item Pool, NEO-PI-R (IPIP-NEO; Goldberg, 1999). Participants' Big Five personality traits were evaluated using the 50-item IPIP, a measure that is available on the Internet. Students were asked to rate how accurately each

statement described themselves using a 7-point scale, ranging from 1 (very inaccurate) to 7 (very accurate). The reliability estimates (alphas) for each trait were .89 for extraversion, .77 for agreeableness, .83 for conscientiousness, .89 for emotional stability, and .77 for openness to experience.

Situational Judgment Tests (SJTs)

Each single-response SJT differed in its original number of items. The SJT created for volunteers originally included 100 items, the one for medical students included 200 items, and the one for HFPs included 97 items (Motowidlo et al., 2009; Kortum & Motowidlo, 2006). Consequently, each single-response SJT was pared down to 50 items to allow for an equal and manageable number of items to be included on each test. This was done by identifying subsets of items according to their item-total correlations, the same method outlined in Motowidlo, Martin, and Crook (2011). First, the mean effectiveness rating made by participants for the half of items from each SJT rated as *effective* by SMEs was computed, and then another mean effectiveness rating made by participants for the half of items from each SJT rated as *ineffective* by SMEs was computed. Then, effectiveness ratings made by participants for each of the items considered to be effective by SMEs were correlated with this overall mean effectiveness rating. The 25 items that correlated most highly with this "effective" mean were included as one half of the new, shorter version of the single-response SJT. The same procedure was used to attain the 25 items that correlated most highly with the "ineffective" mean, producing the other 25 items that were included in the shorter, 50-item version of the test. This procedure allowed for the items producing the most discrimination between effectiveness and ineffectiveness to be included in each single-response SJT.

Additionally, abbreviating the number of items is an attempt to guard against fatigue effects that would likely be induced if the full versions of each SJT were administered to participants in one sitting. See Appendix A.

Judgments about the total 150 single-response SJT items were made by having participants rate each item on a 7-point scale of effectiveness with anchors ranging from 1 = very ineffective to 7 = very effective.

Calculation of ITPs

The extent to which SJT items for all three of the single-response SJTs expressed agreeableness and conscientiousness has previously been measured by graduate students in psychology using a modified version of the scales from Gosling, Rentfrow, and Swann (2003). These scales were transformed into 7-point, bipolar scales. For example, the scale for agreeableness was anchored with 1 = very critical and quarrelsome, 2 = somewhat critical and quarrelsome, 3 = slightly critical and quarrelsome, 4 = neither critical and quarrelsome nor warm and sympathetic, 5 = slightly warm and sympathetic, 6 = somewhat warm and sympathetic, and 7 = very warm and sympathetic. The same procedure was carried out to measure the expression of conscientiousness.

ITP scores were calculated for each participant for each of the three single-response SJTs. In line with the procedure described in Motowidlo & Peterson (2008), each participant's judgments of behavioral effectiveness were regressed on each item's personality expression scores for agreeableness and conscientiousness within a domain. In sum, each person had a total of six ITP scores, one for agreeableness and one for conscientiousness for each of the three professions of interest.

Calculation of Procedural Knowledge Scores

Procedural knowledge scores for effective behaviors and ineffective behaviors were calculated for each participant for each of the three SJTs. A participant's knowledge about effective behaviors within a job was computed as the mean of their effectiveness ratings for the 25 items in a single-response SJT that were judged as effective by experts. Knowledge about ineffective behaviors was calculated in the same way using the other 25 items that were deemed ineffective by experts. These ratings were then reverse-scored so that higher means indicate greater knowledge. Thus, each person had a total of six knowledge scores, one for effectiveness and one for ineffectiveness for each of the three professions of interest.

In addition, estimates of internal consistency for each of the six knowledge scores were computed using Cronbach's alpha. Alphas were .82 for knowledge about effective behavior for volunteers, .82 for knowledge about effective behavior for physicians, .82 for knowledge about effective behavior for HFPs, .72 for knowledge about ineffective behavior for volunteers, .89 for knowledge about ineffective behavior for physicians, and .77 for knowledge about ineffective behavior for HFPs.

Finally, overall procedural knowledge as measured by each 50-item single-response SJT was measured by correlating undergraduates' effectiveness ratings with the experts' mean effectiveness ratings. The correlation between these ratings represents the similarity between novices' and experts' judgments. This scoring procedure works under the assumption that greater similarity to experts' judgments represents greater knowledge.

Results

Objective1

The first objective of this study was to determine whether knowledge about effective behavior and knowledge about ineffective behavior are consistent across professions. The correlations between knowledge about effective and ineffective behaviors in each job appear in Table 1. As shown there, correlations between the three scores for knowledge about effective behavior in all three service professions are relatively high, yielding an average correlation of .62, (p <.01). The same pattern of relations is observed between scores for knowledge about ineffective behavior across jobs, producing an average correlation of .48, (p < .01). These results suggest that there is some consistency in knowledge about effective behavior and ineffective behavior across each of the three jobs examined in this study.

Table 1. Correlations Between Knowledge of Effective and Ineffective Behaviors in all Three Service Domains (n = 149-151)

	M	SD	1	2	3	4	5	6
Knowledge of Effectiveness:								
1. Volunteer	6.09	0.48	.82					
2. Physician	6.15	0.49	.61**	.82				
3. HFP	6.35	0.39	.69**	.56**	.82			
Knowledge of Ineffectiveness:								
4. Volunteer	5.45	0.42	.00	-.06	.12	.72		
5. Physician	6.27	0.51	.24**	.32**	.35**	.51**	.89	
6. HFP	5.93	0.42	.30**	.23**	.38**	.47**	.47**	.77

** $p < .01$ (two-tailed).

Note: Reliability estimates appear in the diagonal.

To examine this pattern of relationships further, the correlations between the six knowledge scores were corrected for attenuation due to unreliability. These corrected correlations provide an estimate of the consistency of the true scores for each type of knowledge across jobs. These correlations are presented in Table 2. The average corrected correlation between knowledge about effective behavior in all three service professions is .75 and the average corrected correlation between knowledge of ineffective behavior in all three professions is .61. About 56% of the variance in knowledge about effective approaches to service encounters is shared across all three domains and 37% of the variance in knowledge about ineffective approaches to service encounters is shared across domains.

Table 2. Correlations Between Knowledge of Effective and Ineffective Behaviors in all Three Service Domains Corrected for Attenuation due to Unreliability (n = 149-151)

	M	SD	1	2	3	4	5	6
Knowledge of Effectiveness:								
1. Volunteer	6.09	0.48	--					
2. Physician	6.15	0.49	.74	--				
3. HFP	6.35	0.39	.84	.68	--			
Knowledge of Ineffectiveness:								
4. Volunteer	5.45	0.42	.00	-.08	.16	--		
5. Physician	6.27	0.51	.28	.37	.41	.64	--	
6. HFP	5.93	0.42	.38	.29	.48	.63	.57	--

Conversely, correlations between knowledge about effective and ineffective approaches to service encounters within each of the three professions are much lower. The average uncorrected correlation between the two types of knowledge within each job is .23, ($p < .01$). The corrected correlations between knowledge about effective and ineffective behaviors in service encounters within each of the three professions are also much lower. The average corrected correlation between the two types of knowledge within each job is .28.

Table 1 also shows that knowledge about effective behavior was not strongly related to knowledge about ineffective behavior in this sample. In fact, the results of a varimax-rotated principal component factor analysis, presented in Table 3, show that a two-factor structure for the six knowledge scores clearly emerges. All three knowledge

scores assessing effective approaches to service encounters loading onto Factor 1, with loadings all above .84, and all three knowledge scores assessing ineffective approaches to service encounters loading on to Factor 2, with loadings above .74.

Table 3. Factor Structure of Knowledge of Effective and Ineffective Behaviors in all Three Service Domains

	Varimax-rotated principal component	
	Factor 1	Factor 2
Knowledge of Effectiveness:		
1. Volunteer	**.87**	.09
2. Physician	**.84**	.04
3. HFP	**.83**	.26
Knowledge of Ineffectiveness:		
4. Volunteer	-.16	**.88**
5. Physician	.26	**.77**
6. HFP	.28	**.74**

Note: Loadings over .40 in absolute magnitude are given in boldface.

Objective 2

The second objective of this research was to investigate whether ITPs are more consistent than knowledge scores across the three jobs examined. In this instance, knowledge was measured using a correlational index and was computed as an overall score for each of the three professions, taking into account both the effective and ineffective items. This was done for two reasons. First, the correlational index provides a more similar metric with which to compare ITPs than the alternative sensitivity score

method, because ITPs were computed as unstandardized beta weights, in keeping with the procedure outlined by Motowidlo & Peterson (2008). Second, computing ITPs for each subset of 25 effective and ineffective items within each job resulted in scores that had very small variances, ranging from .02 to .06, and that were consequently unstable. As a result, ITPs were computed based on the full set of effective and ineffective items for each job. Knowledge scores computed as correlational indices were calculated using the same full sets of incidents so that they could be compared to ITPs for agreeableness and conscientiousness.

As shown in Table 4, the average correlation between overall knowledge scores is .38, ($p < .01$). The average correlation between ITP scores for agreeableness is .23, ($p < .01$) and the average correlation between ITP scores for conscientiousness is .45, ($p < .01$). At first glance, the average correlation between ITP scores for conscientiousness across the three jobs is a bit higher than the correlation between the three overall knowledge scores and the average correlation between ITP scores for agreeableness is a bit lower. However, when the two average correlations between ITP scores across jobs were tested to examine whether they were significantly different from the average correlation between overall knowledge scores across jobs (Williams, 1959) neither of the differences approached statistical significance. These results do not lend support to the conclusion that the two ITP scores are any more or less consistent than overall knowledge scores across domains.

Table 4. Correlations between ITPs Computed as Raw Beta Weights and Overall Procedural Knowledge Scores from Human Factors Professional (HFP), Physician, and Volunteer SJTs (n = 152)

	M	SD	1	2	3	4	5	6	7	8	9
Overall Procedural Knowledge:											
1. Volunteer	0.84	0.08	--								
2. Physician	0.89	0.09	.28**	--							
3. HFP	0.90	0.06	.52**	.33**	--						
ITP Score for Agreeableness:											
4. Volunteer	0.43	0.16	.32**	.19*	.17*	--					
5. Physician	0.53	0.20	.28**	.58**	.31**	.23**	--				
6. HFP	0.56	0.12	.28**	.21**	.33**	.12**	.34**	--			
ITP Score for Conscientiousness:											
7. Volunteer	1.00	0.20	.59**	.19**	.46**	-.18*	.24**	.40**	--		
8. Physician	0.74	0.16	.20**	.35**	.19**	.07	-.23**	.20**	.43**	--	
9. HFP	0.99	0.19	.38**	.17*	.66**	.14	.31**	.12	.59**	.34**	--

* $p < .05$; ** $p < .01$ (two-tailed).

considered correct only when an effective item has been identified (receiving a rating of five or higher on the seven-point Likert scale) or when an ineffective item has been identified (receiving a rating of three or lower on the seven-point Likert scale). This scoring scheme completely eliminates any variance in knowledge scores attributable to extreme response style by only crediting participants for correct identifications of items as either effective or ineffective. The correlations between dichotomous knowledge scores for effective and ineffective behaviors in each job appear in Table 9. As shown, correlations between the three scores for knowledge about effective behavior in all three service professions are still relatively high in comparison to their average reliability estimates ($\alpha = .57$), yielding an average correlation of .41, ($p < .01$). The same pattern of relations is observed between dichotomous scores for knowledge about ineffective behavior across jobs, producing an average correlation of .35, ($p < .01$), which is again quite high in relation to the average reliability estimates for these scores ($\alpha = .69$). These results provide evidence to suggest that the consistency in knowledge about effective behavior and ineffective behavior across each of the three jobs examined in this study is not due to extremity in response styles, which has been eliminated in these analyses via the dichotomous scoring procedure. Conversely, the average correlation between knowledge about effective behavior and knowledge about ineffective behavior is -.07, (NS).

Objective 3

The third objective of this research was to identify how agreeableness and conscientiousness are related to knowledge about behavior in service encounters and to their respective ITPs. Correlations between participants' traits as measured by the IPIP, overall knowledge, knowledge of effective behaviors, and knowledge of ineffective behaviors appear in Table 5. As predicted, agreeableness is positively related to knowledge about effective volunteer behaviors ($r = .18$, $p < .05$). However, agreeableness is not significantly related to any of the other knowledge scores. Thus, the hypothesis concerning the positive relationship between agreeableness and knowledge about how to behave in service encounters is only partially supported. The other prediction that conscientiousness would be positively related to knowledge about these three service domains is also only partially supported. Correlations between conscientiousness and knowledge about specifically ineffective behaviors for volunteers, physicians, and HFPs are .20 ($p < .05$), .21 ($p< .05$), and .17 ($p < .05$), respectively. However, none of the correlations between conscientiousness and knowledge about effective behaviors in any of the three domains reaches significance. Thus, the support for my hypothesis that agreeableness and conscientiousness are positively related to different types of knowledge about how to behave in service encounters is relatively weak.

Table 9. Correlations Between Knowledge of Effective and Ineffective Behaviors Scored Dichotomously in all Three Service Domains (n = 149-151)

	M	SD	1	2	3	4	5	6
Knowledge of Effectiveness:								
1. Volunteer	22.49	2.20	.61					
2. Physician	22.79	2.10	.47**	.62				
3. HFP	23.93	1.34	.41**	.34**	.47			
Knowledge of Ineffectiveness:								
4. Volunteer	19.09	2.64	-.10	-.06	-.07	.63		
5. Physician	23.44	2.41	.10	-.20*	.13	.34**	.79	
6. HFP	22.26	2.38	.18*	.04	.08	.44**	.27**	.64

** $p < .01$ (two-tailed).

Note: Reliability estimates appear in the diagonal.

These correlations between the six dichotomous knowledge scores were corrected for attenuation due to unreliability to provide an estimate of the consistency of the true scores for each type of knowledge across jobs. These correlations are presented in Table 10. After scoring knowledge dichotomously, the average corrected correlation between knowledge about effective behavior in all three jobs is .72 and the average corrected correlation between knowledge of ineffective behavior in all three jobs is .52. When knowledge is measured using the dichotomous scoring procedure, about 52% of the variance in knowledge about effective approaches to service encounters is shared across all three domains and 27% of the variance in knowledge about ineffective approaches to service encounters is shared across domains.

Table 5. Correlations Between Knowledge of Effectiveness, Knowledge of Ineffectiveness, and Overall Knowledge in all Three Service Domains with Personality Traits (n = 149-151)

	M	*SD*	Ext.	Agr.	Con.	Adj.	Ope.
Knowledge of Effectiveness:							
1. Volunteer	6.09	0.48	.01	.18*	.01	-.02	.32**
2. Physician	6.15	0.49	.05	.10	.07	.08	.23**
3. HFP	6.35	0.39	-.01	.04	.10	-.04	.28**
Knowledge of Ineffectiveness:							
1. Volunteer	5.45	0.42	-.02	-.02	.20*	-.04	.02
2. Physician	6.27	0.51	.12	.12	.21**	-.02	.09
3. HFP	5.93	0.42	.05	.05	.17*	-.04	.06
Overall Knowledge:							
1. Volunteer	5.77	0.32	.05	.13	.13	-.03	.27**
2. Physician	6.21	0.40	.11	.15	.17*	.05	.20*
3. HFP	6.15	0.34	-.02	.05	.16*	-.05	.20*
M			44.13	57.70	51.38	43.47	52.23
SD			11.40	8.08	9.49	12.23	7.48

* $p < .05$; ** $p < .01$ (two-tailed).

Note: Ext. = Extraversion, Agr. = Agreeableness, Con. = Conscientiousness, Adj. = Adjustment, and Ope. = Openness.

Although there was no a priori hypotheses to suggest that openness to experience might be related to knowledge scores, Table 5 shows that correlations between openness and knowledge about effective behavior for volunteers, physicians, and HFPs are .32 (p

Table 10. Correlations Between Dichotomous Knowledge Scores for Effective and Ineffective Behaviors in all Three Service Domains Corrected for Attenuation due to Unreliability (n = 149-151)

	M	SD	1	2	3	4	5	6
Knowledge of Effectiveness:								
1. Volunteer	22.49	2.20	--					
2. Physician	22.79	2.10	.76	--				
3. HFP	23.93	1.34	.77	.63	--			
Knowledge of Ineffectiveness:								
4. Volunteer	19.09	2.64	-.18	-.10	-.20	--		
5. Physician	23.44	2.41	.16	-.29	.21	.48	--	
6. HFP	22.26	2.38	.28	.06	.15	.69	.38	--

A varimax-rotated principal component factor analysis was conducted using dichotomous knowledge scores to test whether the same factor structure presented in Table 3 emerged. Results of this analysis, presented in Table 11, show that a two-factor structure for the six dichotomous knowledge scores emerges once again. All three dichotomous knowledge scores assessing effective approaches to service encounters load onto Factor 1, with loadings all above .80, and all three dichotomous knowledge scores assessing ineffective approaches to service encounters load on to Factor 2, with loadings above .67.

< .05), .23 ($p < .05$), and .28 ($p < .05$), respectively. Conversely, openness is not significantly related to knowledge about ineffective behaviors in any of the three professions.

To examine the relations between conscientiousness, openness, and knowledge scores further, scores were collapsed across the three jobs examined to produce three correlations per personality trait. These correlations appear in Table 6. When scores representing knowledge about ineffective behavior in all three professions were averaged to create an overall score for knowledge about ineffective behaviors, the correlation between conscientiousness and this type of knowledge is .23 ($p < .01$). When the same procedure was repeated to aggregate scores representing knowledge about effective behaviors in the three professions the correlation between openness and knowledge about this type of knowledge is .34 ($p < .01$). Both conscientiousness and openness are positively related to overall knowledge scores, computed as a sum of the difference scores for knowledge about effective and ineffective behaviors, yielding correlations of .18 ($p < .05$) and .29 ($p < .01$), respectively.

Table 11. Factor Structure of Knowledge of Effective and Ineffective Behaviors Scored Dichotomously in all Three Service Domains

	Varimax-rotated principal component	
	Factor 1	Factor 2
Knowledge of Effectiveness:		
1. Volunteer	**.80**	.08
2. Physician	**.79**	-.04
3. HFP	**.72**	.07
Knowledge of Ineffectiveness:		
4. Volunteer	-.27	**.82**
5. Physician	.20	**.67**
6. HFP	.12	**.77**

Note: Loadings over .40 in absolute magnitude are given in boldface.

Correlations between participants' traits as measured by the IPIP, overall dichotomous knowledge scores, dichotomous scores for knowledge of effective behaviors, and dichotomous scores for knowledge of ineffective behaviors appear in Table 5. Agreeableness is still positively related to knowledge about effective volunteer behaviors ($r = .18, p < .05$) when knowledge is scored dichotomously. In addition, conscientiousness is positively related to dichotomous knowledge scores for knowledge about ineffective behaviors for volunteers ($r = .20, p < .05$), but is not significantly related to any of the other types of knowledge about ineffective behaviors in any of the other domains when knowledge is scored dichotomously. Thus, when knowledge is scored using a dichotomous scoring scheme, agreeableness and conscientiousness are still differentially related to the two types of knowledge about how to behave in service

Table 6. Correlations Between Knowledge of Effectiveness, Knowledge of Ineffectiveness, Overall Knowledge and Personality Traits (n = 149-151)

	M	*SD*	Ext.	Agr.	Con.	Adj.	Ope.
1. Knowledge of Effectiveness:	6.21	0.38	.06	.14	.07	.01	.34**
2. Knowledge of Ineffectiveness	5.89	0.36	.08	.07	.23**	-.05	.09
3. Overall Knowledge	6.05	0.30	.08	.13	.18*	-.02	.29**
M			44.13	57.70	51.38	43.47	52.23
SD			11.40	8.08	9.49	12.23	7.48

* $p < .05$; ** $p < .01$ (two-tailed).

Note: Ext. = Extraversion, Agr. = Agreeableness, Con. = Conscientiousness, Adj. = Adjustment, and Ope. = Openness.

To examine whether conscientiousness is more highly related to knowledge about ineffective action than effective action in the domains of interest in this study, the difference between these two correlations was tested for significance using the Hotelling-Williams (1959) test. However, the difference does not reach statistical significance ($t(143)df \sim 1.39, p = .12$). The same test was used to examine whether openness is more highly related to knowledge about effective behavior than ineffective behavior in service encounters. This difference is statistically significant ($t(143)df \sim 1.97, p < .05$), suggesting that openness is more strongly related to knowledge about effective

approaches to behaving in service encounters than it is to knowledge about ineffective approaches to behaving in service encounters.

To examine how much variance in the three types of knowledge is explained by personality traits, scores for knowledge about effective action, knowledge about ineffective action, and overall knowledge were regressed on participants' Big Five personality scores. Results from this multiple regression analysis appear in Table 7. Openness yields a significant standardized beta weight for predicting overall knowledge about effective action ($\beta = .33$, $p < .01$) while conscientiousness yields a significant standardized beta weight for predicting knowledge about ineffective action ($\beta = .23$, $p < .01$). Both conscientiousness and openness predict overall knowledge, producing betas of .27 ($p < .01$) and .16 ($p = .05$), respectively. These results show that personality traits account for 13% of the variance in knowledge about effective behaviors ($p < .05$), 7% of the variance in knowledge about ineffective behaviors (NS), and 12% of the variance in overall knowledge ($p < .05$).

Table 7. Standardized Beta Weights for Personality Traits Predicting Different Types of Knowledge

Independent Variables	Knowledge of Effectiveness	Knowledge of Ineffectiveness	Overall Knowledge
Conscientiousness	.05	.23**	.16[α]
Agreeableness	.11	.05	.10
Extraversion	.01	.08	.04
Openness	.33**	.06	.27**
Adjustment	.02	-.06	-.02
R2	.13**	.07	.12**

*$p < .05$. ** $p < .01$ [α] $p = .05$ (two-tailed).

To explore whether knowledge about effective and ineffective action were still consistent across jobs when the effects of participants' personality traits on knowledge were controlled for, partial correlations between the six knowledge scores were computed. These correlations appear in Table 8. Although most of the correlations drop, the average partial correlations between knowledge of effective action across jobs and knowledge of ineffective action across jobs remain relatively high. The average partial correlation between knowledge of effective approaches to service encounters was .59 ($p < .01$) and the average partial correlation between knowledge of ineffective approaches to service encounters was .46 ($p < .01$). Conversely, the partial correlations between knowledge of effective and ineffective action within the same profession were once again lower, with the average partial correlation within jobs being .23 ($p < .01$). This suggests that

personality traits are not the sole drivers of the consistency in these two types of knowledge across jobs.

Table 8. Partial Correlations Between Knowledge of Effective and Ineffective Behaviors in all Three Service Domains Controlling for the Effects of Personality (n = 149-152)

	M	SD	1	2	3	4	5	6
Knowledge of Effectiveness:								
1. Volunteer	6.09	0.48	--					
2. Physician	6.15	0.49	.58**	--				
3. HFP	6.35	0.39	.66**	.53**	--			
Knowledge of Ineffectiveness:								
4. Volunteer	5.45	0.42	.01	-.08	.11	--		
5. Physician	6.27	0.51	.22**	.30**	.33**	.49**	--	
6. HFP	5.93	0.42	.30**	.22**	.37**	.45**	.45**	--

*$p < .05$; ** $p < .01$ (two-tailed).

One potential concern in regard to the findings presented here is that the moderate correlation between knowledge about effective behavior and knowledge about ineffective behavior, in addition to the differential relations between personality traits and these two types of knowledge, may be due to individuals' rating biases that result in a propensity to use the extreme values of a Likert scale when making judgments. This extreme response style may artificially decrease the correlation between knowledge about effective behavior and knowledge about ineffective behavior. To address this concern, procedural knowledge has been rescored dichotomously, so that participants' responses are

encounters, as predicted. Furthermore, openness is still significantly related to dichotomous scores for knowledge about effective behavior for volunteers, physicians, and HFPs yielding correlations of .26 ($p < .05$), .17 ($p < .05$), and .21 ($p < .05$), respectively. Thus, the almost same pattern of relations between personality traits and types of knowledge about each of the three professions examined is observed when knowledge is scored dichotomously, eliminating the possibility that participants' extreme response styles are driving the differential relations between knowledge type and personality traits.

Table 12. Correlations Between Knowledge of Effective Behavior, Knowledge of Ineffective Behavior, and Overall Knowledge Scored Dichotomously in all Three Service Domains with Personality Traits (n = 146-151)

	M	*SD*	Ext.	Agr.	Con.	Adj.	Ope.
Knowledge of Effective behavior:							
1. Volunteer	22.49	2.20	-.02	.19*	-.07	.06	.26**
2. Physician	22.79	2.10	-.06	.08	-.09	.18*	.17*
3. HFP	23.93	1.34	.01	.10	.06	.14	.21*
Knowledge of Ineffective Behavior:							
1. Volunteer	19.09	2.64	.02	-.08	.20*	-.10	-.03
2. Physician	23.44	2.41	-.01	.08	.11	.01	-.01
3. HFP	22.26	2.38	-.03	.08	.07	-.03	.06
Overall Knowledge:							
1. Volunteer	20.82	1.62	-.01	.07	.11	-.03	.16*
2. Physician	23.14	1.70	-.02	.12	.02	.14	.10
3. HFP	23.10	1.41	-.02	.11	.09	.04	.15
M			44.13	57.70	51.38	43.47	52.23
SD			11.40	8.08	9.49	12.23	7.48

* $p < .05$; ** $p < .01$ (two-tailed).

Note: Ext. = Extraversion, Agr. = Agreeableness, Con. = Conscientiousness, Adj. = Adjustment, and Ope. = Openness.

Mirroring what was done in Table 6, dichotomous knowledge scores were collapsed across the three jobs examined to produce three correlations per personality trait. These correlations appear in Table 13. When dichotomous scores representing

knowledge about ineffective behavior in all three professions were averaged to create an overall score for knowledge about ineffective behaviors, the correlation between conscientiousness and this type of knowledge is still significant ($r = .17, p < .05$). When the same procedure was repeated to aggregate dichotomous scores representing knowledge about effective behaviors in the three professions the correlation between openness and knowledge is .29 ($p < .01$). Finally, openness is positively related to overall dichotomous knowledge scores, computed as an average of the dichotomous scores for knowledge about effective and ineffective behaviors, yielding a correlation of .19 ($p < .05$). However, conscientiousness is no longer significantly related to overall knowledge computed using the dichotomous scoring procedure ($r = .10$, NS).

Table 13. Correlations Between Dichotomously Scored Knowledge of Effective Behavior, Knowledge of Ineffective Behavior, Overall Knowledge and Personality Traits (n = 144-151)

	M	*SD*	Ext.	Agr.	Con.	Adj.	Ope.
1. Knowledge of Effective Behavior:	23.11	1.44	.03	.18*	-.06	.15	.29**
2. Knowledge of Ineffective Behavior:	21.60	1.88	-.01	.03	.17*	-.06	.01
3. Overall Knowledge	22.37	1.22	.01	.13	.10	.05	.19*
M			44.13	57.70	51.38	43.47	52.23
SD			11.40	8.08	9.49	12.23	7.48

* $p < .05$; ** $p < .01$ (two-tailed).

Note: Ext. = Extraversion, Agr. = Agreeableness, Con. = Conscientiousness, Adj. = Adjustment, and Ope. = Openness.

To examine whether conscientiousness is more highly related to dichotomous scores for knowledge about ineffective action than knowledge of effective action in the domains of interest in this study, the difference between these two correlations was tested for significance using the Hotelling-Williams (1959) test. However, the difference does not reach statistical significance ($t(143)df \sim .03, p = .98$). The same test was used to examine whether openness is more highly related to dichotomous scores for knowledge about effective behavior than ineffective behavior in service encounters. This difference is statistically significant ($t(145)df \sim 2.40, p < .05$), suggesting that openness is related to knowledge about effective but not ineffective approaches to behaving in service encounters even when knowledge is scored dichotomously.

To examine how much variance in these three dichotomous knowledge scores is explained by personality traits, dichotomous scores for knowledge about effective action, knowledge about ineffective action, and overall knowledge were regressed on participants' Big Five personality scores. Results from this multiple regression analysis appear in Table 14. Openness once again yields a significant standardized beta weight for predicting overall knowledge about effective action ($\beta = .29, p < .01$) while conscientiousness yields a significant standardized beta weight for predicting knowledge about ineffective action ($\beta = .17, p < .05$). Only openness predicts overall knowledge when knowledge is scored using the dichotomous scoring scheme, producing a beta of .18 ($p = .05$). These results show that personality traits account for 15% of the variance in knowledge about effective behaviors ($p < .01$), 3% of the variance in knowledge about ineffective behaviors (NS), and 6% of the variance in overall knowledge (NS) when the dichotomous scoring procedure is employed.

Table 14. Standardized Beta Weights for Personality Traits Predicting Different Types of Dichotomous Knowledge Scores

Independent Variables	Knowledge of Effectiveness	Knowledge of Ineffectiveness	Overall Knowledge
Conscientiousness	-.08	.17*	.09
Agreeableness	.18*	.04	.14
Extraversion	-.07	.00	-.05
Openness	.29**	-.01	.18*
Adjustment	.17*	-.06	.07
R^2	.15**	.03	.06

*$p < .05$. ** $p < .01$ (two-tailed).

To explore whether dichotomous scores for knowledge about effective and ineffective action were still consistent across jobs when the effects of participants' personality traits on knowledge were controlled for, partial correlations between these six knowledge scores were computed. These correlations appear in Table 15. The average partial correlations between knowledge of effective action across jobs and knowledge of ineffective action across jobs scored dichotomously remain relatively high. The average partial correlation between knowledge of effective approaches to service encounters across domains was .37 ($p < .01$) and the average partial correlation between knowledge of ineffective approaches to service encounters across domains was .35 ($p < .01$). Conversely, the partial correlations between knowledge of effective and ineffective action within the same profession were once again lower, with the average partial

correlation within jobs being .06 (NS). This provides more evidence to suggest that even when potential biases due to participants' extreme response styles are removed, personality traits do not seem to be driving the observed consistency in these two types of knowledge across jobs.

Table 15. Partial Correlations Between Dichotomous Scores for Knowledge of Effective and Ineffective Behaviors in all Three Service Domains Controlling for the Effects of Personality (n = 144-151)

	M	SD	1	2	3	4	5	6
Knowledge of Effectiveness:								
1. Volunteer	22.49	2.20	.61					
2. Physician	22.79	2.10	.43**	.62				
3. HFP	23.93	1.34	.37**	.30**	.47			
Knowledge of Ineffectiveness:								
4. Volunteer	19.09	2.64	-.05	-.16	-.05	.63		
5. Physician	23.44	2.41	.10	.17*	.12	.34**	.79	
6. HFP	22.26	2.38	.16	.04	.07	.45**	.26**	.64

*$p < .05$; ** $p < .01$ (two-tailed).

Finally, the last purpose of this study was to test the conjecture that agreeableness and conscientiousness are positively related to their corresponding ITP scores. The correlations among these variables appear in Table 16. Scores on the measure of agreeableness were positively related to ITP scores for agreeableness in the volunteer profession ($r = .21, p < .05$). However, none of the other correlations between ITP scores

and their corresponding basic trait scores are significant. Consequently, there is little support for the prediction that personality traits are positively related to ITPs.

Table 16. Correlations between Overall Procedural Knowledge Scores, ITPs Computed as Raw Beta Weights, and Personality (n = 152)

	M	SD	Con	Adj	Ope	Agr	Ext
Overall Procedural Knowledge:							
1. Volunteer	0.84	0.08	.13	.07	.13	.06	.01
2. Physician	0.90	0.09	.01	.08	.13	.04	-.04
3. HFP	0.90	0.06	.13	.07	.14	.08	-.13
ITP Score for Agreeableness:							
4. Volunteer	0.43	0.16	-.13	-.01	.02	.21*	-.03
5. Physcian	0.53	0.20	.14	.06	.13	.05	.02
6. HFP	0.56	0.12	.15	-.05	-.02	.13	.03
ITP Score for Conscientiousness:							
7. Volunteer	1.00	0.20	.16	.01	.20*	.03	.10
8. Physcian	0.74	0.16	.06	-.07	.10	.09	.08
9. HFP	0.99	0.19	.15	.00	.20*	.00	-.08

* $p < 05$; ** $p < .01$ (two-tailed). Note: Con = conscientiousness, Adj = adjustment, Ope = Openness, Agr = agreeableness, Ext = Extraversion.

In summary, knowledge about effective and ineffective approaches to service encounters are consistent across the three different professions examined, providing some evidence to suggest that there is some commonality in knowledge about how to behave in different jobs. However, this commonality in knowledge can be broken down into knowledge about effective behaviors and knowledge about ineffective behaviors, so that these two types of knowledge represent two clear factors of the contextual knowledge structure. Second, tests of the hypothesis that ITPs would be more consistent across jobs than overall knowledge scores did not provide support for this prediction. Third, participants' agreeableness was only significantly related to knowledge about effective behaviors for volunteers, providing only partial support for my prediction that agreeableness would be positively related to knowledge scores. In addition, conscientiousness was significantly related to knowledge about ineffective approaches to service encounters in all three domains, again providing only partial support for the prediction that conscientiousness would be positively related to knowledge scores across jobs. Additional analyses revealed that openness to experience was positively related to knowledge about effective behaviors in all three domains. Nevertheless, although personality traits account for significant amounts of variance in knowledge scores, knowledge about effective and ineffective behaviors are still highly correlated across jobs even when the effect of all five personality traits is partialed out, suggesting that traits are not the sole antecedents of this consistency in knowledge. Furthermore, when knowledge is rescored utilizing the dichotomous scoring procedure, knowledge scores are still consistent within the two classes of knowledge across domains even when the effect of personality traits is partialed out. Additionally, a two-factor knowledge structure still

emerges when knowledge is scored dichotomously. This suggests that participants' extreme rating biases are not responsible for the differential pattern of responding to effective and ineffective test items that is observed. Finally, agreeableness was significantly related only to ITP scores for agreeableness computed using the effective volunteer items, affording only partial support for the hypothesis that personality traits would be significantly related to their corresponding ITP scores.

Discussion

The objectives of this study were to examine the consistency of two types of contextual knowledge across three different professions and to determine how these types of knowledge are related to agreeableness and conscientiousness. First, the results of this investigation lend support to the notion that knowledge about effective approaches to service encounters is largely independent from knowledge about ineffective approaches to service encounters. The fact that measures of knowledge about effective behavior are not strongly correlated with measures of knowledge about ineffective behavior in this study replicates findings reported by Motowidlo, Martin, and Crook (2011). In addition, this research extends their findings by providing evidence from a component analysis to suggest that knowledge about effective behavior and knowledge about ineffective behavior may actually be two distinct constructs. The fact that eliminating any variance in knowledge scores attributable to participants' extreme response biases left the conclusions drawn from the analyses essentially unchanged provides evidence to suggest that the consistency in knowledge about effective and ineffective approaches to service encounters across jobs is likely due to variance in the true scores for each type of

knowledge that is shared across jobs. However, replication of these findings using knowledge measures created for other domains is needed.

Second, results of this study do not provide conclusive evidence to support the postulate that ITPs are any more or less consistent across different domains than knowledge scores are. Correlations between ITP scores for conscientiousness were not significantly higher than correlations between overall knowledge scores, and correlations between ITP scores for agreeableness were not significantly lower than for overall knowledge scores. These inconclusive findings may be due to flaws in the presumption that undergraduate students have both general and specific knowledge about trait expression in the three domains examined. Perhaps, undergraduates have not yet had the opportunity to glean specialized knowledge about how to handle interpersonal situations in any of these jobs and only possess general knowledge about trait expression. Consequently, overall knowledge scores for this sample may only represent general contextual knowledge rather than specialized, job-specific contextual knowledge. Thus, participants' ITP scores and overall knowledge scores may contain redundant information regarding beliefs about the effectiveness of trait expression in general, work-related contexts, causing the correlations between each type of score across jobs to be near the same magnitude.

Future research could address this limitation by examining the consistency of ITPs and overall knowledge scores across jobs using a sample with job experience in at least one of the domains being tested. Such a sample would ensure that overall knowledge scores would contain both elements of general knowledge about trait expression (i.e. ITPs) and specialized knowledge about how to behave effectively in the

interpersonal aspects of a particular domain. If a study such as this were conducted, one would expect ITPs to be more highly correlated across jobs than overall knowledge scores because knowledge scores for an experienced sample would contain elements of specific job knowledge that would not be strongly correlated with general knowledge in any of the other unfamiliar domains.

Third, the results of this investigation support my prediction that agreeableness and conscientiousness would be positively related to knowledge scores. These relationships replicate those found in earlier work examining the antecedents of contextual knowledge in each of these three domains (Motowidlo, Crook, Kell, & Naemi, 2009; Motowidlo, Martin, & Crook, 2011; Motowidlo, Kell, Martin, Stotts, & Moreno, 2011).

Fourth, results of this study show that conscientiousness is significantly related to knowledge about ineffective action in all three jobs while openness to experience is significantly related to knowledge about effective action in all three jobs. The fact that knowledge about effective and ineffective behaviors are differentially related to personality traits lends some credence to a suggestion made in an earlier paper (Motowidlo, Martin , & Crook, 2011) that because knowledge about effective behavior is not strongly correlated with knowledge about ineffective behavior, these two types of knowledge may develop independently and have different antecedents. However, although the zero-order correlations between conscientiousness, openness to experience, and knowledge scores are significant, the fact that correlations between knowledge about effective behavior in all three jobs and knowledge about ineffective behavior in all three

jobs remain almost unchanged once the effect of personality traits are controlled for suggests that perhaps other antecedent variables besides personality are at play.

Future research should examine the antecedents of each type of knowledge in greater depth and should explore the processes underlying the development of these classes of knowledge. One potential explanation for the differences between each types of knowledge may lie in moral reasoning. Classifying a behavior as either effective or ineffective somewhat resembles classifying it as either morally *right* or morally *wrong*. Some work in moral psychology has suggested that people make moral judgments quickly and unconsciously, without engaging in deliberate reasoning (Greene & Haidt, 2002). Perhaps, individuals make implicit moral judgments about whether a behavior is inherently good or bad, and this intuition drives their responding.

A second possible driver of the differences observed in knowledge about effective and ineffective action may have to do with work values. Work values have been defined as standards that guide action that are relatively stable over time (Dose, 1997) and are significantly related to outcomes such as job satisfaction, motivation, organizational commitment, and job performance (Bering, DeFruyt, & Bouwen, 2003). Of the twelve work values identified by Berings (2002) some that seem particularly relevant to effective and ineffective contextual knowledge are influence, community, competition, earnings, and stress avoidance. Perhaps an individual's assessment of how effective or ineffective a particular action is draws upon his or her work values so that for example, if an individual values earnings and competition, he or she may be more likely to undervalue actions, such as taking extra time to speak with a patient or client, that are not seen as contributing to these goals.

For the most part, results show that participants' personality traits were not significantly related to their corresponding ITP scores as predicted, with the exception of agreeableness being related to ITP scores calculated using the volunteer knowledge measure. While these findings counter much of the data reported in previous work examining the relations between basic traits and their analogous ITP scores (Motowidlo et al., 2006a; b; Motowidlo & Beier, 2010), they are not in discordance with existing ITP theory. Theory states that ITPs are causally influenced by both an individual's basic personality traits and life experiences (Motowidlo et al., 2006a). Consequently, perhaps ITPs were influenced more by learning effects than basic traits in this sample.

Finally, studies concerning the constructs measured by SJTs have been inconclusive and have presented conflicting results (Ployhart & Ehrhart, 2003). This investigation has contributed to the existing literature on the construct validity of SJTs in a variety of ways. This study has extended recent research on the types of knowledge measured by SJTs (e.g., Motowidlo et al., 2006a; Motowidlo et al., 2006b; Motowidlo & Beier, 2010) by providing more information about the generalizability of this knowledge across job domains. The fact that knowledge about effective and ineffective behavior remain relatively consistent across jobs signifies that novices have knowledge about trait expression in work situations that may be applicable to several different jobs. While there may be no face validity in administering a knowledge test created for one job to assess knowledge about an entirely different job, this finding calls into question the value organizations obtain from job-specific SJTs, which can be time-consuming and expensive to develop (Lievens, Peeters, & Shollaert, 2008). Perhaps future research efforts could

focus on the development of a more general, domain-free SJT that measures knowledge about trait expression at work.

The most important theoretical contribution of this study is that contextual knowledge generalizes to some extent across different domains. While this possibility has been raised in the past (Motowidlo & Beier, 2010), it has not been concretely examined until now.

References

Arthur, W. & Villado, A. J. (2008). The importance of distinguishing between constructs and methods when comparing predictors in personnel selection research and practice. *Journal of Applied Psychology, 93*, 435-442 10.1037/0021-9010 .93.2.435.

Baldwin, T. A. (1992). Effects of alternative modeling strategies on outcomes of interpersonal-skills training. *Journal of Applied Psychology, 77*, 147-154.

Berings, D. (2002). The Twelve Work Value Inventory. Brussels: EHSAL.

Berings, D., De Fruyt, F., & Bouwen, R. (2004). Work values and personality traits as predictors of enterprising and social vocational interests. *Personality and Individual Differences, 36*, 349-364.

Borman, W. C., & Motowidlo, S. J. (1993). Expanding the criterion domain to include elements of contextual performance. In N. Schmitt & W. C. Borman (Eds.), *Personnel selection in organizations* (pp. 71-98). San Francisco: Jossey-Bass.

Borman, W.C., Penner, L.A., Allen, T.D., and Motowidlo, S.J. (2001). Personality predictors of citizenship performance. *International Journal of Selection and Assessment, 9*, 52-69.

Campbell, J. P. (1999*). The* definition and measurement of performance in the new age. In D. R. Igen & E. D. Pulakos (Eds.), *The changing nature of performance* (pp. 399-430). San Francisco: Jossey-Bass.

Campbell, J. P., McCloy, R. A., Oppler, S. H., & Sager, C. E. (1993). A theory of performance. In N. Schmitt & W. C. Borman (Eds.), *Personnel selection in organizations* (pp. 35-70). San Francisco: Jossey-Bass.

Dose, J. J. (1997). Work values: an integrative framework and illustrative application to organizational socialization. *Journal of Occupational and Organizational Psychology, 70*, 219–240.

Goldberg, L. R. (1999). A broad-bandwidth, public-domain, personality inventory measuring the lower-level facets of several five-factor models. In I. Mervielde, I. Deary, F. De Fruyt, & F. Ostendorf (Eds.), *Personality psychology in Europe* (Vol. 7, pp. 7-28). Tilburg, The Netherlands: Tilburg University Press.

Gosling, S.D., Rentfrow, P.J., & Swann, W.B. (2003). A very brief measure of the Big-Five personality domains. *Journal of Research in Personality, 37*, 504-528.

Greene, J. D., & Haidt, J. (2002). How (and where) does moral judgment work? *Trends in Cognitive Science, 6,* 517-523.

Joung, W., Hesketh, B., & Neal, A. (2006). Using "war stories" to train for adaptive performance: Is it better to learn from error or success? *Applied Psychology: An International Review, 55,* 282-302.

Kell, H. K., Martin, M.P., & Motowidlo, S.J. (April, 2011). *Medical Students' Knowledge about Medical Professionalism Predicts their Professional Performance*. Poster session presented at the meeting of the Society for Industrial and Organizational Psychology, Chicago, IL.

Kortum, P., and Motowidlo, S.J. (2006). It takes more than technical knowledge to be an effective Human Factors professional. *Proceedings of the Human Factors and Ergonomics Society 50th Annual Meeting, V2*, pp 1958 – 1962.

Lievens, F., Peeters, H., and Shollaert, E. (2008). Situational judgment tests: a review of recent research. *Personnel Review, 37,* 426-441.

Martin, M.P., & Motowidlo, S.J. (April, 2010). *A single-response SJT for measuring procedural knowledge for human factors professionals.* Poster session presented at the meeting of the Society for Industrial and Organizational Psychology, Atlanta, GA.

McDaniel, M. A., Hartman, N. S., Whetzel, D. L., & Grubb, W. L. (2007). Situational judgment tests, response instructions, and validity: A meta-analysis. *Personnel Psychology, 60*, 63-91.

McDaniel, M. A. & Nguyen, N. T. (2001). Situational judgment tests: A review of practice and constructs assessed. *International Journal of Selection & Assessment, 9*, 103-113.

Motowidlo, S.J. (2003). Job performance. In W.C. Borman, D.R. Ilgen, and R.J. Klimoski Eds.), *Comprehensive handbook of psychology, volume twelve: Industrial and organizational psychology.* New York, NY: Wiley, pp. 39-53.

Motowidlo, S. J., & Beier, M. E. (2010). Differentiating specific job knowledge from implicit trait policies in procedural knowledge measured by a situational judgment test. *Journal of Applied Psychology, 95*, 321-333.

Motowidlo, S.J., Borman, W.C., & Schmit, M.J. (1997). A theory of individual differences in task and contextual performance. *Human Performance, 10*, 71-83.

Motowidlo, S. J., Crook, A. E., Kell, H. J., & Naemi, B. (2009). Measuring procedural knowledge more simply with a single-response situational judgment test. *Journal of Business and Psychology, 24,* 281-288.

Motowidlo, S., Dunnette, M.D., Carter, G.W. (1990). An alternative selection procedure: the low-fidelity simulation. *Journal of Applied Psychology, 75*, 640-647.

Motowidlo, S. J., Hooper, A. C., & Jackson, H. L. (2006a). A theoretical basis for situational judgment tests. In J. Weekley & R. Ployhart (Eds.), *Situational judgment tests: Theory, measurement, and application.* (pp. 57-81). San Francisco: Jossey-Bass.

Motowidlo, S. J., Hooper, A. C., & Jackson, H. L. (2006b). Implicit policies about relations between personality traits and behavioral effectiveness in situational judgment items. *Journal of Applied Psychology, 91*, 749-761.

Motowidlo, S. J., Kell, Martin, M. P., H. J., Stotts, A. L., & Moreno, C. A. (2011). *Measuring knowledge about virtuous professionalism in medical practice.* Manuscript submitted for publication.

Motowidlo, S. J., Martin, M. P.., & Crook, A. E. (2011). *Relations between personality, knowledge, and behavior in service encounters.* Manuscript submitted for publication.

Motowidlo, S. J., & Peterson, N. G. (2008). Effects of organizational perspective on implicit trait policies about correctional officers' job performance. *Human Performance, 21*, 396-413.

Ployhart, R. E. & Ehrhart, M. G. (2003). Be careful what you ask for: Effects of response instructions on the construct validity and reliability of situational judgment tests. *International Journal of Selection and Assessment, 11*, 1-16.

Schmit, M. C., Motowidlo, S. J., DeGroot, T., & Kiker, D.S. (1996, April). *Explaining the relationship between personality and job performance.* Paper presented at the meeting of the Society for Industrial and Organizational Psychology, San Francisco.

Schmitt, N., & Chan D. (2006). Situational judgment tests: Method or construct? In J. Weekley & R. Ployhart (Eds.), *Situational judgment tests*. (pp. 135-155). San Francisco: Jossey-Bass.

Schmitt, N., Cortina, J. M., Ingerick, M. J., Wiechmann, D., Borman, W. C., Ilgen, D. R. & Klimoski, R. J. (2003). Personnel selection and employee performance. *Handbook of psychology: Industrial and organizational psychology,* 77-105.

Stemler, S. E., & Sternberg, R. J. (2006). Using Situational Judgment Tests to Measure Practical Intelligence. In J. A. Weekley, R. E. Ployhart, E. Robert (Eds). *Situational judgment tests: Theory, measurement, and application.* (pp. 107-131). Mahwah, NJ: Lawrence Erlbaum.

Williams, E. (1959). *Regression analysis*. New York: John Wiley.

Appendix A

Sample Single-Response SJT Items Created for Physicians (Motowidlo, Kell, Stotts, & Moreno, 2011):

A patient found dead at home was taken to the ER. The physician spent 25 minutes with the family explaining what efforts were made to revive the patient after he was admitted to the ER and answering their questions about the patient's pain and final moments.
(Effective)

When a patient's nurse neglected to bring an advanced knee-rehabilitation machine into the room as this physician had asked, the physician slammed the nurse up against the wall in front of the patient and reprimanded her.
(Ineffective)

Sample Single-Response SJT Items Created for Volunteers (Motowidlo, Crook, Kell, & Naemi, 2009):

This volunteer regularly brings a disabled woman to church. She talks to her kindly yet honestly, thinks of other ways she and others can offer her support, asks her what else she can do to help, and lets her speak for herself and take care of her own needs as much as she can.
(Effective)

When this volunteer went to the medical records section to pick up a patient's chart, he was told the chart would not be ready for another few minutes. The volunteer complained loudly, became verbally aggressive, and expressed anger at having to wait.

(Ineffective)

Sample Single-Response SJT Items Created for Human Factors Professionals (Motowidlo, Martin, & Crook, 2011):

The HFP was proposing changes based on the results of a usability test. The clients were concerned about proposed changes, so the HFP listened to the clients' reasons and proposed alternate solutions to address their concerns.

(Effective)

One member of a team was asking numerous questions about possible problems with an interface. The HFP said the design was fine, dismissing the concerns and ignoring the input. The HFP then moved the discussion to a new topic.

(Ineffective)